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Canada and Its Railways

By LIEUT.-COL. T. VIEN, K.C., B.A., L.L.L.,
Board of Railway Commissioners, Ottawa.

(Before Montreal Chapter, January 22, 1931.)

I NEED all the encouragement which I derive from the kindness of your remarks and the cordiality of your reception, to overcome the timidity with which I rise to address so distinguished an audience. When our friend, Mr. Belanger, with his usual abundant and irresistible eloquence, persuaded me to accept your gracious invitation, I assumed that I would be expected to speak informally at one of your semi-monthly meetings. But, when my name was set down on your annual program to speak at this very important function, I confess that I felt so greatly honored that I overlooked the additional responsibility that this entailed. As I did not know that I should resign so early from the Railway Commission, and that the disposition of the pending matters would tax my time to such a degree, I crave your indulgence if I fail to live up to your expectations, but I do take great pride and pleasure at being with you to-night.

The importance and efficiency of your organization, its rapid growth and progress since its incorporation in 1920, the urgent public demand which it fulfills are now well known and universally recognized.

The trade and economic contest into which the civilized nations of the world have plunged since the war, and the stronger and keener competition which it brought about, have introduced problems which even the intelligent manufacturer and trader cannot hope to solve successfully without better organization. The gradual absorption and development of natural resources, the exploitation of new fields of commerce, the increase of population, the higher standards of living and the resultant demands for more wages and better labor conditions, are but a few of the innumerable influences felt in the economic life of to-day.

All producers, farmers as well as manufacturer, must either adapt their methods to meet this situation, or retire from the field. They must possess a keener sense of the possibilities of their trade, and improve their plans so as to eliminate waste and increase production per unit of cost.

In the search for efficiency, the urgent necessity of finding better methods of cost accounting, more accurate analysis and closer estimates of the factors affecting profits, became abundantly clear, and a new science was born.

Your society has rendered invaluable services by promoting the study and application of this science, by developing and fostering in commerce and industry a wider adoption of these scientific methods, and by providing an organization to increase the knowledge and proficiency of its members.

Your experts were largely responsible for having greater attention paid by industry in general to plant location and construction, to

newer and better types of machines, to economy in the production and use of power, to new and improved standards of wages, offering increased pay for individual effort and efficiency, and to the limitation of waste, lost time, and shop errors. With reliable statistics, you have enabled the management properly to place responsibility, intelligently to compare the merits and demerits of various manufacturing processess, accurately to determine the profitable selling price and the lines of goods which could or could not be produced for a market where the price was already fixed by competitors.

Such is your inestimable contribution to the welfare of industry, and I need not very strongly emphasize that the advantage and necessity of cost accounting have nowhere attracted more attention and been received with greater gratitude than in the railway and marine world, where so many perplexing questions arise daily in almost every phase of our transportation activities, involving not only the problems always incidental to the management of large concerns, but also thorny problems of great magnitude arising between capital and labor, and between conflicting political or economic sections of our country.

One Century Old

We have just passed the first centenary of railway beginnings in the world, and we are rapidly approaching the first centenary of the establishment of the first Canadian railway. Perhaps you will bear with me if I dwell a little upon this early period.

I shall relate the transformation which has taken place from the days of the canoe and of the forest path to those of the railway and of the steamer; I shall recount some of the almost insuperable difficulties which confronted railway pioneers and early builders. It will be my endeavor to excite your admiration and thankfulness for the far-seeing, courageous and patriotic men who, by providing speedy and cheap transportation, have created unity and understanding between the various provinces which now compose our great Dominion.

The characteristic features of the modern railway, the iron road and the steam motive power, developed gradually as necessity urged and groping experiment permitted.

The iron road came first. As early as 1630, one Master Beaumont had laid down broad wooden rails near Newcastle, England, on which a single horse could haul 50 or 60 bushels of coal. The new device spread rapidly through the whole Tyneside coal fields.

A century later, it became the custom to nail thin strips of wrought iron to the wooden rails. In 1767, cast iron rails were first used. They were at first flanged rails, for flat wheels, but soon thereafter flat rails were used with flanged cart-wheels.

In 1801, the first public line, the Surrey Iron Railway, was chartered, but it was not till 1825 that the Stockton & Darlington Railway proved that the iron way could be used by the general public as well as by the colliery owner. At the outset, this railway was only a toll-road upon which any carrier might transport goods or passengers in his own vehicles, but, as experience showed it soon became necessary for the company to undertake complete service.

The invention and adaption of steam as a motive power for railway purposes took a much longer time. Nowadays, it seems simple to utilize the expansive power of water heated to vapor, and to turn it into mechanical energy. Yet centuries of experiment, slowly acquired mechanical dexterity, and an industrial atmosphere were needed to develop the steam engine and later the locomotive.

Old chronicles tell us that two hundred years before Christ, Hero of Alexandria had invented steam fountains and steam turbines, but they were never anything more than scientific toys. In the 17th century, Solomon de Caus claimed that he could move carriages and navigate ships with the vapor of boiling water. He was jailed as a madman by order of Cardinal Richelieu. In 1628, Giovanni Branca, an Italian, invented an engine, but it lacked efficiency, and was never used.

Once more, the coal mines of England led the way. As the shafts were sunk to lower levels, it became impossible to pump water out of the mines through horse power, and the aid of steam was sought at the close of the 17th century. Savery devised the first commercial engine or steam fountain which applied cold water to the outside of the cylinder to condense the steam inside and produce a vacuum.

Later, Papin invented the first cylinder and piston engine. In 1705, Savery, with the assistance of Newcomen and Cawley, taking up Papin's idea, separated the boiler from the cylinder and thus produced a vacuum by forcing the piston into which automatic pressure worked the pump. Humphrey Potter, a youngster hired to open and shut the valves of the Newcomen engine, made it self-acting by tying cords to the engine beam. He had thereby his hour for play or idling, and proved that if necessity is the mother of invention, laziness is sometimes its father. The Newcomen engine required thirty-five pounds of coal to produce one horse-power per hour. To-day it takes one pound. Half a century passed without material advances.

Then, James Watt and his partner Boulton, instrument makers in Glasgow, seeing that much of the waste of the steam was due to the alternate chilling and heating of the cylinder, added a separate condenser to take care of the chilling and kept the temperature of the cylinder uniform by applying a steam jacket. Later, by other improvements, they brought the reciprocating engine to a still higher stage of efficiency.

Finally, on the morning of October 6th, 1829, at Rainhill, England, there was a contest without a parallel in either sport or industry. There were four entries which were neither race horces nor stage coaches, but rival types of newly invented steam locomotives. To win the £500 prize offered, the successful engine, if weighing six tons, had to draw a load of 20 tons at ten miles an hour, and had to cover at least 70 miles a day. A Liverpool merchant declared that only a parcel of charlatans could have devised such an impossible test, and he wagered that if a locomotive ever went ten miles an hour, he would eat a stewed engine-wheel for breakfast.

The Motive Power

The contest had come about as the only solution of a deadlock between the stubborn directors of the Liverpool and Manchester Railway, then under construction, and their still more stubborn engineer,

George Stephenson. The railway was nearly completed and the essential question of the motive power to be used had not yet been decided. The more conservative authorities thought it was best to stick to the horse.

Experienced English engineers in England, when called into consultation, advised the perplexed directors to install twenty-one stationary engines along the thirty-one miles of track and haul the train with a rope, rather than to experiment with the new travelling engine. Stephenson, with a few backers, urged the trial of the locomotive.

"What can be more palpably absurd and ridiculous", declared the "Quarterly Review," "than the project held out of locomotives travelling twice as fast as stage coaches." We should as soon expect the people of Woolwick to suffer themselves to be fired off upon one of Congreve's ricochet rockets as trust themselves to the mercy of such a machine, going at such a rate.

To decide the matter, the directors organized a contest and offered a prize. George Stephenson's engine, the "Rocket" alone met all requirements. In a seventy-mile run, it averaged fifteen miles an hour, and reached a maximum speed of twenty-nine miles.

The choice of the engine was not the only problem on the hands of the directors of the new railway. They had found difficulty in obtaining a charter from Parliament. Canal proprietors and toll-road companies had declined against this attack on vested rights. County squires had spluttered over the damage to fox covers. Horses could not plough in neighboring fields. Widows' strawberry beds would be ruined. What would become of coachmen and coach-builders and horse-dealers? "Or suppose a cow were to stray upon the line; would not that be a very awkward circumstance? And not only would the locomotive is it shot along do such varied damage; in truth, it would not go at all; the wheels, declared eminent experts, would not grip on the smooth rails, or else the engines would prove top-heavy.

I have related these incidents only to show you by what slow process the steam railway came into existance, and the persistent toil of so many known and unknown workers which was necessary before some genius, or some plodder, standing on their failures could reach success.

Cruder means of transport had served the need of earlier days, when each district was self-contained. But the workshop and the craftsman's tools were rapidly giving way to the huge factories and the power-driven machines, the division of labor was becoming more complex, traffic was growing, each district was more dependent on others for markets in which to buy and to sell. Captains of industry and finance of the nineteenth century were beginning to find them selves with ten times the pressure of affairs which had occupied their forerunners, and so industrial revolution brought the railroad, and the railroad quickened the pace of industrial revolution.

Canada's Railways

For a Canadian, the history of transportation in Canada is a study still more fascinating and instructive. In the early stage of our country's life, the only form of transportation was by water. In the maritime provinces, the main highway was the sea, while in Upper

and Lower Canada, it was great lakes and the Saint Lawrence River. Later, the Dominion Government constructed canals at appropriate points in order to overcome the rapids and rended the inland waters more valuable. The fur traders used these waterways to push further into the interior, and down the rivers the Indians conveyed their valuable cargoes of pelts.

But the needs of the agricultural population soon had to be met by the construction of roads to connect the farms with the markets; local roads led to the necessity for main trunk roads as chief arteries to meet the requirements of organized government, the administration of justice and trade.

So, when the news of the success of British railway lines came across the ocean, British North America awoke to the necessity of establishing the railway system within her territory as a relief to the transportation disadvantages under which she was laboring.

Canada owes her first railway as well as her first steamboat to Montreal. On the 25th of February, 1832, a charter was granted for the construction of a railway from Laprairie, on the Saint Lawrence, to Saint John's, P.Q. The right of way was sixteen miles long. The work was commenced in 1835, and the railway was opened to traffic with horses in July, 1836, and first worked with locomotives in 1837.

A charter was obtained in 1834 for a railway from Cobourg, to a point on Rice Lake. The same year, a charter was granted to the London and Gore Railway Company, to build a line from London to Burlington Bay, extending to the navigable waters of the Thames and Lake Huron. But, the first railway, in Upper Canada, was constructed by the Erie and Ontario Company, to restore the ancient portage around the Falls of the Niagara River, between Queenstown and Chippewa, which had been superseded by the Welland Canal. This line was chartered in 1835. It was opened as a horse railway, as the grade near Queenstown was beyond the capacity of the locomotive power of that day.

Between 1832 and 1845, over a dozen charters were granted in Upper and Lower Canada, none of which except the horse railway just mentioned was followed up, and the Laprairie Road until 1847, continued to be the only railway using locomotives.

In 1845, the St. Lawrence and Atlantice Railway Co. was chartered to build a connecting line with the Atlantic-St. Lawrence, which was an American line from Portland. This road became, by subsequent amalgamation, part of the Grand Trunk, and was therefore the beginning of that extensive line. The St. Lawrence and Atlantic was built to secure the supremacy of the Upper St. Lawrence route by giving Montreal a winter outlet at Portland.

This closed the period of early railroad history in Canada, but the great era of railway construction was soon to open. This era can be divided into six chapters surrounding the development of the Grand Trunk, the Intercolonial, the Canadian Pacific, the Canadian Northern, the Grand Trunk Pacific—including the National Transcontinental—and the Canadian National Railways. The history of the Canadian Northern, of the Grand Trunk Pacific, and of the Canadian National is so well known that I propose limiting my remarks to the other three.

The establishment of these three systems was influenced by two principal aims and purposes. One was political: the desire to clamp together the settlements scattered across the continent, to fill waste spaces, and to strengthen national unity. The other was commercial: the desire to capture an even expanding trade and traffic. Local convenience and local interests have played their part, but the larger strategy of railway building was dominated by the motives which I have just mentioned.

The Grand Trunk Railway

Canada had scarcely completed her magnificent system of canals when the rapid expansion of American railways, projecting in all directions over the great Western grain region, warned her that a new and formidable rival had appeared and that greater exertions would be required, not only to continue to be a successful competitor with the United States for western trade, but also to maintain her own status against the individual states commercially opposed to her.

When Montreal was arrested half-way in her single-handed attempt to push a railway to Portland, and the Great Western found itself financially unable to carry out its project, the Legislature, in 1849, passed an Act by which the Province of Upper and Lower Canada guaranteed the interest on the sum required to complete any railway of seventy-five miles or more in length, of which one half had already been laid by the proprietors. This act was found insufficient and did not produce the desired results. In 1851, a bill was passed providing for the construction of a main trunk line. This Act looked to possible aid from the Imperial Government in the form of a guaranteed loan, an offer having previously been made by Earl Gray to assist the colonies in that manner to the extent required to construct a military line between Halifax and Quebec. The Acts of the legislature purported to extend this boom to a railway between Quebec and Hamilton, in order that Canada, as well as the Maritime colonies, might be traversed by the road to be built with Imperial aid. In that event, the trunk line was to be undertaken by the Province as public work. If the Imperial guarantee were not obtained, the Province would undertake the work on her own credit, provided the municipalities would bear half the expense. If even this plan failed, the Act extended the Provincial guarantee to the principal and interest on one half the cost incurred by local companies to be formed to construct the line and operate the railway.

There were innumerable conferences between Provincial Premiers, several missions to London and negotiations of a most intricate character.

The Imperial Goverment declined to aid and so did the municipalities. Financial arrangements for the line between Montreal and Toronto were made with the firm of Betts and Brassey, English railway contractors of great wealth and influence, who were seeking the privilege of controlling an expenditure of such magnitude. They had just completed extensive works in France and were ready to engage in railway construction in Canada. English capital to any amount that might be needed would be supplied, provided the works were entrusted to contractors who were in the confidence of English capitalists.

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For launching a doubtful project, such as was the Grand Trunk Railway of Canada viewed as a commercial undertaking, no machinery could be better devised than that possessed by these gentlemen. The prospect of extensive appropriations, involving purchases of land from the nobility and gentry, weekly payment of wages to the middle and lower classes, large orders to iron masters, wood merchants, engine and carriage builders in all parts of the kingdom, banking transactions and sales of securities of the heaviest description, gathered around the eminent contractors a host of dependents and expectants, in and out of Parliament.

To prepare the scheme for the large appetite of the London market, its proportions were extended from the 500 miles between Quebec and Hamilton, to upwards of a thousand miles, extending from Lake Huron to the Atlantic. Amalgamation was made with existing lines in Canada, and an American line running to Portland, the Atlantic and St. Lawrence, was leased. The construction of the Victoria Bridge at Montreal, was part of the undertaking. The anticipation of a profitable dividend of eleven and a half per cent. was expressed in the Company's prospectus.

The eminent names on the subscription list and the wealth of the contractors, carried on the work until 1855, when the company came before the Canadian Parliament for financial assistance. This was repeated in 1856. A grant of £900,000 was voted in 1855, and in 1856, the province which had until then stood in the position of a first mortgagee to the extent of its advances, gave up this position, and went beyond the shareholders, in order that the latter might issue preference bonds to fill the vacated space.

At the end of the decade, in 1859, the company had completed a large system of railways extending literally throughout the whole province of Canada, from Lake Huron to Riviere-du-Loup, 125 miles below Quebec, and also to the Atlantic seaboard, at Portland, Me., a total of 951 miles.

The long commercial depression extending over the U.S. and Canada, put a stop to the further construction of railways from 1860 to 1870, and told heavily on the existing lines.

The Intercolonial Railway

As early as 1839, Lord Durham, in his famous report, had made the following prophetic statement: "The completion of any satisfactory communication between Halifax and Quebec would in fact produce relations between these Provinces that would render a general union absolutely necessary . . . . The formation of a railroad from Halifax to Quebec would entirely avoid the leading characteristics of the Canadas. Instead of being shut out from all direct intercourse with England during half of the year, they would possess a far more certain and speedy communication throughout the winter than they now possess in summer."

The importance of the Intercolonial Railway as an Imperial work, the necessity for something of the kind as a defence against possible American aggression, and the position of Canada as part of the Empire, were dealt with at length in a most interesting document written in 1858 by the Honourable John A MacDonald and the Honour-

able John Rose. The memorandum read in part as follows: "We are sensible that we need not dwell on the grave and possibly disastrous consequences which, if a rupture should unhappily arrive with the United States, may result from the want of communication in winter between England and the interior of the Province; but it is evident that the safety of the colony can only be secured either by keeping, from the moment of the first apprehension of danger, a military power within it of such magnitude as would repel any invading force during the five months when reinforcement or supplies could not be obtained by sea; or the means must be created of throwing in that force and transporting them to those points which are assailable . . . . While, therefore, the commercial and material advantages to Canada which would follow the construction of the road are comparatively unimportant, she feels it her duty to urge the high national considerations which demand that the work should be undertaken."

As in the case of the Grand Trunk, conferences were held between the representatives of the various provinces interested, and missions were sent to London to confer with the Imperial Government.

On the first of May, 1858, an address was voted to Her Majesty, by both branches of the Legislature of Nova Scotia, urging the construction of this railway. On the 16th of August, 1858, the Canadian Legislature voted an address to Her Majesty, supporting the memorandum from Sir John A. MacDonald and Honourable John Rose, above referred to. In 1861 the Legislatures of New Brunswick and Nova Scotia continued to urge the project at every opportunity, and passed bills authorizing loans for the construction of the railway, with the expectation that the government of Canada would take the same course. The Canadian Government, however, considered that a reliable survey and estimate should precede any further negotiations with respect to ways and means. A sum was placed in the estimates for that purpose, and it was arranged that the duty should be performed by a commission of three engineers, one appointed by Canada, the other jointly by Nova Scotia and New Brunswick, and the third by the Imperial Government. On the 22nd of August, 1863, the Canadian Government appointed Mr. Sanford Fleming as its representative. When this appointment was communicated to the other governments, Mr. Fleming was immediately nominated by Nova Scotia and New Brunswick, and by the Duke of Newcastle on behalf of the Imperial Government.

Before the close of 1864 he made his report, establishing the length of the new railway to be constructed at 458 miles, and the average cost at $46,000 per mile, or a total of $20,635,500. In October of the same year a conference of delegates from all the provinces, including Newfoundland, was held at Quebec. At this conference a series of seventy-two resolutions were adopted, by which it was proposed to unite Eastern and Western Canada with New Brunswick, Nova Scotia and Prince Edward Island; provision was also made for the admission of the territories, British Columbia and Newfoundland. These resolutions formed the basis of the articles of Confederation, and were subsequently incorporated in the British North America Act. Among other things, it was declared that "The General Government shall secure, without delay, the completion of the Intercolonial Railway from Riviere-du-Loup, through New Brunswick, to Truro, in Nova Scotia."

On the 12th of April, 1867, the Imperial Parliament passed a second measure, entitled "An Act for Authorizing a Guarantee of Interest on a Loan to be Raised by Canada, Towards the Construction of a Railway Connecting Quebec and Halifax."

In July, 1867, the Minister of Public Works for Canada instructed Mr. Sanford Fleming, Engineer-in-Chief, to proceed at once with the surveys. Several battles among interested parties were fought in connection with the routes through New Brunswick, and the choice between iron and wooden bridges. By an Order-in-Council of the 9th of November, 1872, the railways in New Brunswick and Nova Scotia were reconstructed, and called the Intercolonial Railway.

The Canadian Pacific Railway

I have already taxed your patience to such a degree that time will not permit me to make more than a brief reference to the very interesting circumstances which led to the construction of the Canadian Pacific Railway. Suffice it to say that for many years prior to Confederation, this subject had engaged the attention of travellers and statesmen. Innumerable pamphlets and letters had been written to show its use and feasibility, and some efforts were made to obtain enabling legislation. In 1851 a Canadian Pacific Bill was introduced in the Canadian Legislature. It was adversely reported upon, on the ground that the adjustment of the rights of the Indian Tribes was a pre-requisite condition. Many ways of reaching the Pacific Ocean, through the Rocky Mountains, were projected. The idea remained in a nebulous stage until Canada acquired the territorial rights of the Hudson's Bay Company. The necessity for the immediate construction of a western road was accentuated by the insurrection of Riel and the half-breeds of the Red River in 1869 and 1870, and by the difficulties which arose in reasserting constituted authority. But the decisive factor was the entrance of British Columbia into the Dominion of Canada. On the 1st of July, 1870, the Canadian Government, by an Order-in-Council, undertook to secure the commencement, simultaneously within two years from the date of union, of the construction of a railway from the Pacific towards the Rocky Mountains, and from such points as might be selected east of the Rocky Mountains towards the Pacific, to connect the seaboard of British Columbia with the railway system of Canada, and further to secure the completion of such railway within ten years from the date of union.

In 1871 the entry of British Columbia into the Dominion was confirmed by an Act of Parliament, which also provided for the construction of the proposed railway by private enterprise aided by public grants of money and land.

In 1872 another Act of Parliament was passed to regulate the terms and conditions on which a company might construct a Canadian Pacific Railway. This was implemented by two other Acts, which were passed during the same Session, the first incorporating the Inter-Oceanic Railway Co. of Canada, and the second incorporating the Canadian Pacific Railway Company.

As there could not be two transcontinental railways under construction at the same time, the government endeavoured to amalgamate the two interests, but failing in this, they reverted to the authority given them by the Canadian Pacific Act of 1872, and granted a

charter to another company with Sir Hugh Allan at its head, which undertook to build and operate the required railway for a land grant of 50,000,000 acres, and a cash subsidy of $30,000,000. The circumstances under which this charter had been granted were the subject of Parliamentary investigation, which resulted in the resignation of Sir John A. MacDonald's government, and the immediate surrender of the charter by the company.

In 1874 Parliament passed an Act authorizing the government to borrow £8,000,000, aided by an Imperial guarantee for a portion of it, for public works, and also passed an Act to provide for the construction of the Canadian Pacific Railway, repealing the Act of 1872.

In compliance with this Act the government selected a route, and in 1875 work was begun at Thunder Bay, on Lake Superior, westwardly, the line being intended to cross the Red River at or near Selkirk, a place about twenty miles north of Winnipeg, and to proceed across the prairie by the narrows of Lake Manitoba, and into British Columbia by the Yellow Head Pass of the Rocky Mountains. The MacKenzie government was defeated at the polls in 1878, and their plan was abandoned by Sir John A. MacDonald. This closed the second phase of the effort to build the railway.

The new government determined to proceed with vigour. Acting on the Parliamentary authority already existing, they entered into contracts for several small sectional pieces of road, and secured sanction for an appropriation of 100,000,000 acres of public lands to be vested in commissioners and sold at $2 an acre, to provide funds for the immediate construction of the railway, so as to keep faith with British Columbia.

But the disadvantages of such a plan were obvious. The Government reconsidered its decision and arranged that the railway should be built and operated by a responsible company. After several fruitless negotiations with other capitalists, an agreement was arrived at with a syndicate which eventually built and operated the railway. This course proved to be by far the wisest one. But it cannot escape the notice of even the most casual observer that the builders of the Canadian Pacific Railway took up the matter in a comprehensive and business-like way, and by their courage and determination successfully accomplished their object, which seemed to present greater difficulties than a government could successfully contend with.

I think that the following excerpt from an article published in the "London Truth" on the 1st of September, 1881, will be of interest to you:

> "The Canadian Pacific Railroad Company has begun, I see, to launch its bonds. A group of Montreal and New York bankers have undertaken to float ten million dollars worth of the Company's land grant bonds and the Bank of Montreal, with its usual courage, has taken one-fourth of the entire loan. This announcement looks as if the Canadians were going to raise the necessary capital on the other side of the water, but I have a shrewd suspicion that they have no real intention of doing anything of the kind. I would as soon credit them with a willingness to subscribe hard cash in support of a scheme for the utilization of icebergs. The Canadian Pacific Railway will run, if it is ever finished,

through a country frost-bound for seven or eight months in the year, and will connect with the Western part of the Dominion a Province which embraces about as forbidding a country as any on the face of the earth. British Columbia, they say, have forced on the execution of this part of the contract under which they become incorporated with the Dominion, and believe that prosperity will come to them when the line is made. This is a delusion on their part. British Columbia is a barren, cold, mountain country, that is not worth keeping.

"It would never have been inhabited at all, unless by trappers of the Hudson Bay Company, had the 'Gold Fever' not taken a party of mining adventurers there, and ever since that fever died down the place has been going from bad to worse. Fifty railroads would not galvanize it into prosperity.

"A friend of mine told me—and he knew what he was talking about—that he did not believe the much touted Manitoba settlement would hold out many years. The people who have gone there cannot stand the coldness of the winters. Men and cattle are frozen to death in numbers that would rather startle the intending settler if he knew, and those who are not killed outright are often maimed for life by frost-bites. Its street nuisances kill people with malaria, or drive them mad with plagues of insects, and to keep themselves alive during the long winter they have to imitate the habits of the Esquimaux.

"As for the country as a whole it is poor and it is crushed with debt. The Province and City of Quebec are both notoriously bankrupt, and the latter was obliged to go to Paris with its last loan, probably because nobody would lend it here.

"This 'Dominion' is, in short, a 'fraud' all through, and is destined to burst up like any other fraud."

Yet, in 1929, the C.P.R. owned 14,655 miles of line, moved 14,565,275,970 ton-miles of revenue freight, and collected in tolls more than $211,635,660.97.

When the announcement came that the first through train had started from Montreal to Vancouver, on the 30th of June, 1886, the London Times observed with great enthusiasm—"The Dominion contains a population of five millions of people, and its area consists of nearly three and a half millions of square miles. Such a population inhabiting so vast a territory, has manifested so profound a faith in its own future that it has conceived and executed within a few years a work which a generation ago might well have appalled the wealthiest and most powerful of nations. It is a material manifestation of the growing solidity of the Empire, and a proof of the invincible energy of the American subjects of the British Crown."

We have reason to be proud of and grateful to our railway pioneers and builders. The settlement of this country and the increase of its wealth which, once started, have been so rapid it the late half century would have been impossible without the open channels of communication which the railways have furnished to convey to urban and rural markets our abundent food supplies, and the industrial and commercial commodities produced at home or imported from abroad.

Eighty years ago, there was no national consciousness based on common history and common aspirations. The only link between the scattered colonies was a common loyalty to the same King, and a common antagonism to our neighbor to the south. Notwithstanding all the fluctuations of trial and triumph caused by the cyclical crisis, failures of crops, low prices and slow trickling in of settlers, our great railway chieftains, with indomitable courage, tenacity of purpose and breadth of vision, kept aglow their own faith in the future of this Country, and communicated it to others. Let us honor them and all those who participated in their great undertakings; let us also endeavor to follow in their footsteps. A nation cannot stand still. In the competition of nations, it must march on triumphantly in the van, or fall hopelessly into the rear. We have inherited an immense wealth amassed at the expense of heroic sacrifices and titanic labor. Shall we be unworthy of our forebears? Our sacred duty is to continue their efforts, to live up to their noble examples, to guard in the hearts of our children their ideals and their hopes, and to transmit to those who come after us the glorious heritage to which we have succeeded, and, so far as lies in our power, with an added measure of greatness.

Costs and Distribution of Overhead in a Department Store

By A. E. WALFORD, C.A., L.I.A.,
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(Before Montreal Chapter, December 4, 1930)

THIS subject is rather outside the usual scope of cost accountants and even of industrial engineers, for in the practice of accountancy there has always seemed to be a very definite distinction between the fields of production, and of consumer distribution.

This distinction is, however, rapidly breaking down under the many changes in distribution during the past ten years, for all production now depends for its stability and long term profits upon an efficient consumer distribution.

There should for this reason, therefore, be a value in the study of retail problems, even by the accountant who has little apparent contact with retailing.

The subject may be broken up into four parts:

1st—The place of the department store in distribution, and the conditions under which its accounting procedure is developed and carried out.

2nd—Costs in the general operating statement.

3rd—Costs in the departmental operating statement.

4th—Trends in accounting and control technique.

Nature of Business

The first stores operated on the department principle were established in America some time before 1860, and so the idea has had approximately 75 years' trial on this continent.

Retail statistics are not easily available, but it is estimated that department stores on this continent do a total volume of approximately seven billion dollars per year, which is probably about one-sixth of the total retail business on the continent. These figures establish the importance of the department store in our present economic system. In its present stage is closely approaches the status of a public utility.

Professor Nystrom, an outstanding retail economist, defines a department store as "A retailing institution which deals in many lines of goods, each separated or departmentalized from the rest in location, in system of accounting, and in management." The title, however, is commonly applied only to stores in which dry goods, apparel and home furnishings are carried.

The outstanding characteristics of the department store are:

1. Central location. This is vital to secure the volume necessary for profitable operation. The cost of the site is absorbed through the utilization of a number of floors for selling.

2. Convenience to the customer. Having many departments under one roof, it saves the customer time and steps. It provides many free services and conveniences, such as delivery, charge accounts, liberal adjustments, and unless most closely controlled, provides a variety of parasite services such as rest rooms, etc., which are of considerable value and convenience to the customer, but cut most seriously into the merchant's profits.

3. It applies the principle of division of labor. Due to its size, personnel are chosen for their value as specialists in selling, in buying, in operation, in research, and in services of numerous kinds.

4. It is consistently the largest advertiser of any class of retailer.

Does Not Correspond to Mass Production

The department store is frequently spoken of as having much in common with the mass production plant, but the comparison is quite wrong. In industry, the application of power multiplies the output of a worker many times over, and gears the worker to the machine he tends. In retail distribution, service is highly personalized, and the place of machinery is restricted to such fields as records and statistics, marking and ticketing of merchandise, and the operation of cash systems and registers, pneumatic tubes, etc.

The application of robot salesmen is becoming broader every day, but these are, as yet, applicable only in the distribution of a very narrow range of highly standardized and intensely advertised merchandise. A robot cannot create demand, or make two sales grow where one grew before.

A second distinction between the large industry and the large store lies in the range of its output. As a general rule the factory has become large through production of low cost of a limited selection of articles in common and continuous demand. The retail store lives entirely through its ability to present a continuously changing selection of "fashion right" merchandise. Consequently, any attempt at standardization soon reflects itself in diminishing individuality.

Stores are adopting price lining, model stocks, and other plans to eliminate needless stock, but these developments represent simplification, not standardization, of merchandise.

Include Interest in Operating Costs

Department store executives are real converts to the principle of co-operation. They believe in it so thoroughly that they even practice it. To illustrate the progress made in co-operation, it has been universally agreed that interest is a part of cost of operation, and must be included in operating expenses. To a group of cost accountants this must seem a phenomenal achievement.

This spirit of co-operation led, many years ago, to the organization of the National Retail Dry Goods Association, which operates divisions dealing with every phase of retail operation. The Controllers' Congress represents the control, analytical and financial phase. Through the support of the N.R.D.G.A., the Harvard Bureau of Business Research prepares and publishes an annual compilation of reports filed by some 600 department stores. The Controllers' Congress has developed an Expense Manual which is a wonderful help to the individual store executive, since it enables comparative figures to be studied on a universal basis, and ensures compilation of his own figures on a scientific basis at reasonable cost.

Psychology plays a most important part in shaping retail accounting policy and procedure. A department store's contact with the public, and its primary source of revenue, is through a sales force, a buying force, and a sales promotion force, all the members of which are chosen primarily for their ability to predict, and meet the public's demand for merchandise. Their interest and efficiency in the matter of figures, and systems, is of quite secondary importance to their ability in selecting wanted merchandise and then selling it at a profit. Inevitably the record and control system of an institution so organized must be flexible and must take into account the danger of damping the enthusiasm of the people on the "firing line" through excessive routine. This not only calls for a very high standard of record organization but it requires in the personnel operating those records a sound appreciation of the true functions of the store and an ability to see the point of view of the direct selling personnel in the organization.

General Operating Statement

So much for the background. The next phase we should consider is the general operating statement.

Expenditures of a department store are divided into two broad fields:

Merchandise cost—the total cost to land merchandise at the store receiving room (exclusive of the cost of operation of foreign buying office), and,

Operating expense—the total outlay of the store required to receive, handle, sell and deliver the merchandise, operate the store services, and last but not least, collect and disburse the proceeds.

Distribution of merchandise cost is the simple phase of the problem, and for lack of time will be left out of our study.

Analysis of Operating Expense

Operating expense, (see Chart I) under the standard manual, is divided into five functional classifications. These five, in the large store classification, are in turn sub-divided into eighteen sub-functional classifications, relating to the most common divisions of operating

responsibility. The functional classification is intended to analyse expense in conformity with the purpose of the expenditure.

A separate and parallel analysis is also made into fourteen natural divisions, which represent the method of expenditure.

These two analyses are illustrated in Chart I. Functional and sub-functional classes are listed across the top—natural divisions down the left side. Time will not permit an explanation of the scope of the different groups, but the titles are fairly descriptive.

A very simple system of coding is used. Any account is indicated by six figures in three pairs:

Thus—	21 — 01 — 01	and 21 — 01 — 02
	21—Executive Office.	21—Executive Office.
	01—Pay Roll.	01—Pay Roll.
	01—Executive.	02—Executive Clericals.
Or—	43 — 06 — 01	and 43 — 06 — 02
	43—General Advertising.	43—General Advertising.
	06—Supplies.	06—Supplies.
	01—Cuts and Mats, etc.	02—Artiste Drawings.

Chart I

OUTLINE OF EXPENSE DISTR
UNDER
STANDARD MANUAL OF CONTROLLED
LARGE STORE CLASSIFICAT

Figures in clear indicate the number of accounts comprised in each group.
Figures in brackets represent the code used for identification.

	ADMINISTRATIVE (20)					OCCUPANCY (30)			
	(21) Executive Office	(22) Accounting Office	(23) Accounts Receivable and Credit	(24) Superintendency	(25) General Store	(31) Operating and Housekeeping	(32) Fixed Plant and Equipment	(3) ...nt, ...and ...ver	(42 Sale Promo Offic
(1) Pay Roll	2	11	5	12	3	5		1	5
(2) Rentals							2		
(3) Advertising									
(4) Taxes					1		2		
(5) Interest					1		3		
(6) Supplies	1	1	1	3	1	1		2	1
(7) Service Purchased						1		2	
(8) Unclassified	1	3	2	4	4	1		1	1
(9) Travelling	1	1	1	3	1	1			1
(10) Communication		1	1	1					
(11) Repairs						2			
(12) Insurance	1				4		2		
(13) Depreciation							3		
(14) Professional Services			1		1				1
(15) Contra Credits							1	1	
Number of Accounts	6	17	11	23	16	11	13	7	9
A Total of 198		73				31			

Even a casual study of the scheme shows its possibilities for further sub-division to meet local conditions, and its adaptability to machine accounting and analysis.

The earlier attempts at expense analysis and comparison dealt entirely with natural divisions. It soon became apparent, however, that comparison under method of expenditure was not sound, since results of two stores might show the same outlay in expense, but great differences in classification, due to one store generating its own power and light, where another would purchase, or one operating its own delivery service and the other contracting for it, etc., etc.

Comparison now is, in consequence, confined fairly closely to the functional and sub-functional classifications.

Distribution to Selling Departments

Having roughly covered the analysis of operating expense for the general operating statement, let us turn to the third phase of the problem—distribution of expense to selling departments.

Chart I

EXPENSE DISTRIBUTION
UNDER
ANNUAL OF CONTROLLERS' CONGRESS
STORE CLASSIFICATION

ANCY)		PUBLICITY (40)			BUYING (50)				SELLING (60)		
) ed and ment	(3) ht, and ver	(42) Sales Promotion Office	(43) Newspaper and Gen. Advertis.	(44) Direct Mail	(45) Display	(52) Merchan. Manage. and Buying	(53) Domestic & Foreign Buy'g Offi's	(54) Receiving and Marking	(61) Comp. of Sales People	(62) General Selling	(63) Delivery
	1	5			3	4	1	1	1	5	4
							1				
			8	1							
							1				1
											1
	2	1	2	2	2	1	1	2		3	7
	2										2
	1	1		2	1	1	1	1		4	5
		1			1	2	1	1		1	1
				1		1					
											1
							1				1
							1				1
		1					1				
	1										1
	7	9	10	6	7	9	9	5	1	13	25
			32			23			39		

Here there exists a great divergence of opinion among executives, and an equal divergence in practice. One school endorses a semi-annual distribution of expense, pro-rating a large proportion on net sales. Another school advises monthly distribution, and the charging direct of every cost or value which may be figured accurately. Between these two extremes exists an infinite variety of practice. In this phase of the store's records the views of the local management determine the exact form and extent of analysis to be made.

I shall not attempt to discuss the detailed distribution of expense other than to indicate a few of the bases which have gained wide acceptance:

1. Direct costs—covering such items as newspapers and other media, cuts, drawings, etc.

Chart II

RATIO RESULTS FOR DEPARTMENT STORES
OF OVER TWO MILLIONS ANNUAL VOLUME
FROM REPORT OF
HARVARD BUREAU OF BUSINESS RESEARCH
All Figures Represent Percentages of Net Sales

	Common Figure	Large Cities	Losses over 2.5%	Profits over 2.5%
Cost of Merchandise	66.4	65.5	67.8	65.3
Expense	32.8	33.3	35.9	30.9
Profits	.8	1.2		3.8
Losses			3.7	
Administration	7.3	6.9	8.1	7.0
Occupancy	7.0	7.0	8.1	6.6
Publicity	4.5	4.9	5.3	3.6
Buying	4.3	4.6	4.6	4.3
Selling	9.7	9.9	9.8	9.4
Cash Discounts	2.7	3.2	2.7	2.8
Pay Roll	16.8	16.9	17.8	16.2
Rate of Stock Turn	4.2	4.7	4.2	4.3

2. Number and/or dollar volume of transactions—used in distributing cost of such departments as—credits, receiving and marking rooms, accounts payable, etc.

3. Value of floor space, or area occupied—used in distributing occupancy costs, and services such as elevators, housekeeping expense, etc.

4. Value of display units—used in distribution costs chargeable for display or merchandise in show windows and interior displays.

5. Packages delivered—the most approved method is to give a "weight" to packages according to the dimensions and difficulty of handling.

6. Cost of production, or standard "production centre" rates—used in distributing the cost of service and product of central units, such as—multigraph and addressograph departments, Hollerith machines, work rooms, domestic steam supply, etc.

7. Net sales—used in distributing the cost of executive functions and store wide services.

Need for Accuracy

It is essential to charge expenses as equitably and as directly as possible against departments for several reasons:

1. The merchants' margin of profit is so narrow that few can afford to carry unprofitable departments, and none can afford to overlook unprofitable conditions which may be susceptible to correction.

2. Profit sharing contracts with department managers are becoming increasingly common, and a sound basis of cost finding is a prerequisite to mutual satisfaction under such a contract.

3. It has been found by experience that only when department managers become "net profit conscious" do they appreciate the final effect of the operations of their department. To gain such an appreciation, they must secure figures showing the total costs incurred, or to be absorbed by their departments.

There are, however, considerations on the other side of the picture:

1. Departments are operated primarily as co-operative units dealing in different types of merchandise. Many department store executives feel that the larger and the stronger departments should share in carrying the burdens of the weaker.

2. A strong argument against the detailed distribution of functional overhead expenses, lies in the fact that the department manager has no means of controlling or even materially modifying such outlays.

3. The last, but probably the strongest argument of all, is that analytical distribution of expense costs money, and there are so few places in which the department store manager finds it possible to save money, that he is often willing to run the risk of introducing short-sighted economies in order to hold down his expense ratio.

Recent Progress

In conclusion—let me say that three developments of comparatively recent growth are profoundly affecting the method and scope of expense analysis and distribution.

1st—A tremendous revival of interest in economy, replacing the idolatry of volume and size so current in all business thinking during the past ten years.

2nd—Improvements in budgetary control technique.

3rd—Realization of the possibilities of research.

It required the most drastic deflation in history to prove that mere size means nothing, but the lesson has been learned. Business executives now realize that a million times nothing is still nothing, and that a dollar salvaged from operating expenses pays a lot more dividends than additional volume done for the exercise involved.

Improvements in budgetary control and research methods are, to-day, modifying the attitude of executives toward masses of detailed figures presented in identical form at frequent intervals.

When budgets are soundly prepared and flexibly controlled, the attention of the management is focussed on significant variations, rather than on masses of comparisons with previous years, which do not reflect the need for changes in policy.

The stores which to-day are doing the most successful job of control, are doing it by maintaining a reasonable balance between the use of standardized day-to-day and month-to-month statistics, budgetary control, and special research studies, which deal with various phases indicated by general analysis as being out of line. These special studies have the great advantage of keeping one's point of view fresh.

Needless to say, these same stores are operating under managements who appreciate that plain ordinary "horse sense" counts in the final analysis more than any one other ingredient of success, and that the bills have to be paid with dollars, not percentages.

Margins are Small

So far the discussion has been of an entirely theoretical nature. I should like now to show a table, No. II, which will give an idea of the margin upon which the average merchant operates, and the need for effective control, if his operations are to bring a satisfactory profit.

These figures are taken from the 1929 summary report issued by the Harvard Bureau of Business Research. They show that for all department stores having a volume of over two million dollars annually, the annual net profit amounted to 8/10 of 1% of the sales. Stores in the larger centres fared somewhat better, earning 1 2/10%. Taking stores earning over 2½% profit, we reach an average of 3.8%. In order to earn this 3.8c. they had an investment in merchandise averaging over the entire year approximately 15c. for each dollar of annual sales. To earn 3.8c. the merchant risked his capital to the extent of 65.3c. in stock, and 30.9c. in expense. In other words, a decline in merchandising efficiency of 5%, or an increase in expense of 12½% would have wiped out his profits entirely.

You will note also that even the high profit group earned over 70% of their net earnings by taking discounts, while the less prosperous groups earned as final net profits only a fraction of their discounts.

The relation of net profits to total pay roll is also very illuminating. In no group did net profits amount to as much as 25% of pay roll. In other words, even the most successful merchants were betting 4 to 1 on their ability in managing people.

R. H. Macy & Company, one of the most aggressive managed stores in the world, last year reported 8% of net sales as net profits, before providing any return on shareholders' equity. Best & Company, which is one of the most fashion alert companies in the world, reported about 8.4% of sales as net profit on the same basis.

The fact that these percentages stand out so strongly as exceptional performances show the very narrow margin on which the average merchant operates, and the necessity for sound control methods.

This statement of general results contrasted with the results of two outstanding successful companies, I hope, shows a balanced picture. The whole point is, that the average run of management earns a very narrow but consistent profit, while outstanding managements earn a very satisfactory profit. This condition is, of course, by no means peculiar to the retail field since it applies in every type of business, but in no field is the value of management more definitely shown in operating results than in merchandising.

SOCIETY'S EXAMINATION

THE first examination of the Society was held in Montreal on May 5, 1931. It consisted only of the paper on Cost Accounting, all of the candidates claiming exemption from examination in Commercial Law, Bookkeeping, and Accounting, through equivalents of the Montreal Board of Trade. It is necessary for all to try the Cost Accounting paper, however.

Ten candidates tried, and nine passed, as follows:

J. Heughan	99
J. K. MacLean	98
C. E. Swift	97
D. B. Peddie	95
W. Watson	93
N. W. Brown	93
R. J. A. Phaneuf	92
G. S. Mackay	87
C. D. Fraser	69

Those of the above list, whose equivalents are acceptable, will be eligible to try the second or final examination, in 1932.

The Society will endeavor to hold an examination, either first or second or both, next May at any point where there are four or more candidates.

The following is the paper set on Cost Accounting for 1931:

FIRST EXAMINATION

COST ACCOUNTING

Tuesday, 5th May, 1931. Time: 7-10 p.m.

Marks

8. 1. Name four advantages of a Cost System and Budget System interlocked and operating together.

10. 2. Name five factors to be considered in the installation of a Cost System.

15. 3. Name three Wage Systems and give a brief practical example of how each one is applied.

25. 4. Name the formulae used in the calculation of the following methods for distributing factory overhead and give a brief practical example of how each one is applied:

(a) Prime Cost Method.
(b) Productive Labour Cost Method.
(c) Productive Labour Hour Method.

8. 5. Define depreciation and give four ways in which obsolescense may occur.

6. Three men, A, B and C, are employed in the same department doing the same kind of work. A is paid 75 cents per hour; B, 60 cents per hour, and C, 40 cents per hour. Applied manufacturing expense may be figured as either 75 per cent. of direct labor cost or 43¾ cents per direct labor hour to apply the entire expense of the period to the production of the period.

Four different production orders for identical products were handled. A, working alone, completed the first order in

17. four hours; B, working alone, completed the second order in five hours; and C, working alone, completed the third order in seven and one-half hours. All three worked on the fourth order which required two hours' work by A, one hour by B, and two and one-quarter hours by C. Compute the amount of manufacturing expense applied to each order by both the direct labor cost method and the direct labor hours method.

7. The cost records of a factory showed a total average cost to make and sell of $2.66 per direct labor hour for April and $2.76 for May. Other information shown by the cost summaries was:

	April	May
Wage Cost per Payroll Hour	$1.28	$1.24
Wage Cost per Direct Labor Hour	1.65	1.62
*Factory Cost per Direct Labor Hour	2.19	2.24
†Total Cost per Direct Labor Hour	2.66	2.76
General Factory Expense per Direct Labor Hour	.23	.26

*Factory cost per direct labor hour includes the wage cost, apportioned expense, and departmental direct expense.

†Total cost per direct labor hour includes factory cost and administrative and selling expense.

Prepare a comparative statement showing the amount of each component part comprising the total cost per direct labor

17. hour for each month and the increase or decrease in cost for May as compared with April as to each component of the total cost per direct labor hour.

100

A young couple who had just married received many presents after establishing their home in a suburb. One morning they received two theatre tickets, with a note, which read: "Guess who sent these?"

All efforts to discover the donor's identity failed, but on the appointed evening they went to the theatre, returning very late. To their astonishment everything of any value in the house had been carried away.

On a table in the dining room they found this note: "Now you know."

"Profit only starts where cost leaves off."—Electrotypers Bulletin.

Industrial Engineering and Its Relation to Standard Costs

By J. E. GOUDEY,
Canadian Cottons, Ltd., Hamilton.

(Before Hamilton Chapter, January 14, 1931.)

AN invitation from your secretary to speak to you this evening was an honor I could not very well refuse. I was a charter member of the Canadian branch of the Cost Accountants Association and have heard many papers that make mine appear rather elementary, for I realize that I am speaking to those who are better qualified than myself to speak on the subject of costs, so that my position here reminds me of the adherents to the parsee faith in India, who after death are placed on the Tower of Silence, near which hovers a flock of vultures eagerly waiting to pick their bones.

During the past few years my activities have led me away from the actual preparation of costs to the more interesting problem of cost reduction. In other words I graduated to what was called an "efficiency expert," a title I could never appreciate. Fortunately our friends across the border have coined the term "industrial engineer" which seems more appropriate. However, there is yet another that appears on the horizon, this time called "higher control," although not a title yet it covers the application of "scientific management," and makes effective the research work of the industrial engineer and cost accountant.

As my experience has been confined to textiles, possibly what I am about to say is not applicable to other industries, however, I have complied with the secretary's request to write a paper that treats with industrial engineering and costs relating to my experience.

Search For New Methods

The man who wishes to enter into this particular kind of work is sometimes called a cost accountant or a statistician, which is quite correct if his activities are confined to the accumulation of detail figures, and as a rule his knowledge of manufacturing is very limited, so it would seem that if he is going to make his department the pulse of the business he should have a thorough knowledge of the industry he represents, be able to take time studies and be an expert salesman of ideas, he must study psychology and understand human nature, be a good mixer yet hold the respect of his co-workers, he should expect no sympathy and be able to withstand criticism without resentment. He must have every confidence in himself as well as in the management, and be able to ignore antiquated traditional methods in order to reduce the cost of manufacture. If he is told that a job cannot be improved because it has been done in the same way for thirty-five years, that should not discourage the cost man, it is his task to find a cheaper way to do it just as well and sell the idea to all concerned, this of course is not the easiest way to make friends as there are those who consider any improvements by the cost man, who now becomes an

industrial engineer, a reflection on their ability, so the engineer must be very tactful and try to influence employees to make suggestions along his line of thought then get behind their ideas and push.

The rank of the industrial engineer is rather vague, his success depending upon the interest the management takes in his activities, and if they are willing to take the initiative. He is responsible for accomplishment, yet as a rule he has no authority, and it is rather difficult to convey the results of his research to others perhaps not always in sympathy. His task at best is a difficult one.

Every innovation has to fight for its life, and every good thing has been condemned in its day and generation. Errors once set in motion continue indefinitely unless blocked by a stronger force, and old ways will always remain unless some one invents a new one and then lives for it.

This is up to the industrial engineer as standardization is the order of the day and is not always an easy task as there is a common tendency to cling to old ways and methods, not to oppose progress but rather cling to inertia.

If job standardization is recognized as a fundamental business policy it does more than save a few hundred of dollars here and there, it brings about a decrease in costs throughout the entire business.

A standard job is a job that has been reduced to the point of specialization and includes no more elements than are absolutely necessary plus allowance for necessary delays, rest and fatigue.

Analyzing Jobs

It is difficult to impress on some overseers the advantage of segregating the elements of a job in order to specialize, but when it has had time to prove its value the advantages are usually admitted.

Muscular effort which forms the basis of the greater part of productive work in our factories can be measured with a fair degree of accuracy. The unit of measurement represents one minute of normal effort, and this is made up of two factors, viz., a fraction of a minute of physical and a fraction of a minute of necessary relaxation, the total of these two factors always equal one minute, but the variation between them will depend on such elements as the exertion, strain and concentration involved, also the length of the cycle.

It will be found that once a job has been reduced to the point of specialization, and allowed to run a few weeks, or better yet a few months, the operator becomes accustomed to the change, and will exceed the standard that at first seemed sufficient. It must be remembered that the help will try to prove the first standard excessive, and will receive a certain amount of encouragement from their co-workers, and it isn't until they have accepted the new way as a matter of fact that we can get the most from the change.

It is true that some overseers as a rule do not choose help intelligently and some times are influenced by the circumstances of the prospects or by recommendation so that we find quite a few misfits, this makes it hard for the analyst who has to do the best he can with those at hand.

After the routine has been established, whether it is best or not, it is recorded in writing on what we term our "Standard Practice."

Our chief use of this is to definitely record the duties of the operator, it may also include kind of work, speeds and number of machines, etc.

A highly efficient operator may have reduced physical motions to a minimum, and impress one that the operator is not accomplishing as much as expected.

Time studies revealed that an employee apparently very fast was accomplishing much less than another apparently much slower. The former received the higher wage.

Standardization usually brings about an equalization of rates and uniform basis for setting the rates. When the value of each job is determined.

When new "indirect labor" is taken on, the overseer simply presents him with a copy of the job with duties defined and the time for each. This automatically reduces supervising.

In the case of direct labor, an instructress held as a spare hand, teaches the new employee, this will avoid being taught erhaps by an inefficient hand in inefficient ways.

Standardization is never completed. Shorter methods and better costs will always be possible.

Link With Standard Costs

In introducing standardized jobs the foundation of the standard cost system is automatically established, if this fact were recognized cost systems would be more highly respected. No doubt you are all acquainted with the usual procedure, the manager calls in an accountant to install a cost system and will usually request that it tie in with the general accounting. The cost clerk gathers the detail, condenses it and presents it to the manager, who watches the weekly fluctuations over or under the standard. After a time he has a fair idea of what the cost report will show by the volume of production, so really he knows approximately what the result is going to be before the report come in, but he does not know whether the standard as set by the cost clerk is a fair estimate of what his costs should be. Even though fluctuations are consistently below the standard, it is by no means a sign of efficient organization.

In view of this fact, I cannot see how a cost department could live up to its responsibility of steering the ship on a successful course or that it could be the pulse of the business. It took me some time to realize this. Since I have had the opportunity of analyzing cost systems installed by experts which lack cost control or any possibility of effecting cost reduction. In other words the manager cannot tell whether the processing is carried on efficiently or not.

After the industry has been subject to time study, and machine adjustments attended to we are ready to talk piece rates. Every job should be time studied, and all help assured of a square deal.

Time studies are very interesting, help that is hostile will soon see that it is in their own interest to help the analyist. Some will say they are doing more work than others that get the same pay and will welcome a time study. Help with full time jobs seldom resent time studies, it is those who have a part time job who object.

Adjusting Rates

When this work is finished the rates should be balanced according to the skill and experience of each employee, when everybody is satisfied in this respect wage incentives, bonuses or other forms of inducment may be considered. This is delicate business because an employee who has been time studied and allowed 20% time to himself will not take the time allowance but will work continually at a greater speed so that the total amount received at the end of the week may exceed that of the foreman, or a higher skilled man who will say that he works just as hard. The most satisfactory arrangement that I know is the group system in which the rates are balanced for a standard per cent. of efficiency and an incentive is offered for each point of efficiency over the standard, the extra amount earned to be pro rated on a basis of rates to include the foreman. I have seen the efficiency increased 10 points under this system. The help will report any who have a tendency to lag, changes, repairs, oiling, etc., will be accomplished quicker, also the spirit of co-operation will be increased.

Straight bonuses and other forms of inducement that vary with individual efficiency have their disadvantages in that those who are ambitious to earn the maximum amount have no interest in those who are content with the basic rate and as you know there are apt to be those working perhaps through no fault of their own who are satisfied with an amount equal to a small per cent. of the average. In any case there should be an apportunity for the fast workers to profit from their extra efforts. I believe it feasable to set piece rates for indirect labor even for scrubbing floors, washing windows, etc.

Wage Complications

The question is often asked of the rates for female labor should be the same as male labor doing the same work. This is difficult to decide in a general way so I can only express my opinion concerning the textile industry. I would say that in view of the standard rates at present in force, that if females can do the work equally as well, then it is not a man's job, and a rate that would be very good for a girl would not be sufficient for a man. If we expect our male employees to uphold our Canadian standard of living, we must pay them accordingly, and as our standard of living is high compared with other countries in this industry it would seem that we should only employ men on such work that could not be done by girls and where we could pay an amount sufficient for their requirements. If this were more generally recognized, I believe we would have fewer disputes. I refer in this case to direct labor, indirect male labor causes the greater concern, although this class is always available for amounts equal to those set by the Provincial Government in the Minimum Wage Act. It a question whether they should be paid a higher rate than direct female labor, it would seem that extra consideration should be shown a married man. In any case it will depend upon business conditions, and I am sure we all look forward to the time when these problems can be readjusted satisfactorily to all concerned as one can work properly when they feel they are not getting a square deal.

We should endeavour to balance the rates and set a standard to represent the ideal condition not the impossible, and improve every opportunity to attain our objective.

What Standard Represents

We should be satisfied that the standard represents an efficient organization and try to avoid fluctuations caused by machinery being stopped for material from the previous process, a situation that often arises through lack of foresight in those responsible. We should also make sure of a correct labor distribution, know what the average production of each machine should be, check the speeds and inspect the machinery for defects causing an inferior product.

A chart for payroll distribution is designed from the job analysis, this eliminates guesswork, a very good reason why costs should start in the factory. The distribution of foreman's time is more or less approximate and will depend upon individual circumstances. Usually some basis of distribution is available.

Standard production should be figured on the average efficiency expected and allowance made for a portion of machinery being stopped for orders, repairs, etc.

The underlying principles of cost accounting are the same for all industries, in that we use the same basis for distribution of expenses, such as valuation for machinery depreciation, areas for building depreciation, total capitalization for fire insurance and interest on capital, employees for group insurance, horse power for power costs and the total of all expenses for factory expense.

The above items are recorded on a balance sheet and posted into the ledger against each process account, together with labor and supply charges. Production by processes is also charged in the same manner.

Comparing Results with Standard

We are now in a position to compare the current activities with the standard as shown for each item in each process account, anything under deserves commendation and anything over investigation. Direct labor should not show any variation unless the piece rates have been changed.

Indirect labor will show the greatest variation and is caused by machinery being stopped, maybe for orders or repairs or surplus help kept on or transferred to other departments, a practice not always justified, additional help hired to meet rush orders and not laid off during slack periods, overtime, oiling, cleaning or repair work sometimes planned for favorites. In many cases the above exceptions cannot be avoided, but if there isn't a systematic method of checking these items the practice is sometimes abused. One of the greatest leaks is machinery stopped for material from the previous processes, this is the production manager's responsibility. The cost of this leak can be measured in dollars and cents, by comparing the standard unit cost with the actual.

Repair labor is charged against each process and the time and cost of each job reported weekly and the unabsorbed time charged against the mechanical department.

Depreciation, interest, insurance, power cost, salaries and office expenses are fairly constant. Supplies and factory expense should be reported in detail to the management every week. The cost of the supplies is easily determined if a perpetual inventory is established.

Adjusting Variations

It does not seem necessary to prepare finished costs after a standard is once established, variations are simply adjusted on a per cent basis, for instance if the finished standard cost of an article is recorded to show the direct labor cost and the total expense cost, and the current direct labor cost does not vary, then there will be no change in this item. If the current expense as shown in the ledger is up 100% then we simply add 10% to the standard finished expense unit cost, this saves time and expense of figuring costs every period and amounts to the same thing. This is the greatest advantage of the standard cost system, and after once established it should be very effective and inexpensive to operate. It can be run by a girl while the man in charge spends his time in the plant in the search of ways and means of cost reductions.

I have outlined the procedure of installing a cost system, that is, a sound, inexpensive, common sense method of operating a plant efficiently, one that is simplicity itself and may be understood by anybody willing to devote a few hours of study, as a cost system itself will not reduce costs. There are, however, several items in which there is a difference of opinion such as the valuation of capital. It would seem that the valuation of machinery should represent the original cost less depreciation to date, and if this does not prove to be the case then it may be a good reason why costs should be independent of general accounting. In this respect, I may say that cost periods should be in even weeks, while the general accounting periods are usually by the month.

Some will say that those amounts distributed on the valuation basis do not have to be exact for each process as the total will reflect in the finished cost. This may be all right if no product is sold from the intermediate processes.

Machinery valuation is a problem subject to much debate, as some may have been written off and still be as good as new, and again some may have been made at the plant and not charged into the capital account.

Personally I would think it proper to continue charging in depreciation so long as it is being used.

Idle Machinery

Then we have other cases such as allocating expenses to individual groups of machinery and showing as unabsorbed that portion chargeable to idle machinery and not charged to production, and the correct method of figuring process inventories. Some will consider the material plus labor for each process, while others do not include the labor, also what portion of idle machinery may be run on orders accepted below cost.

After the standard has been allowed to run a year or so, it is an easy matter to budget, in fact a correct standard is nothing more than a budget. The value of the department will depend upon the knowledge the management has of cost detail and the interest shown in them. If the reports are not studied then they become simply detail for filing purposes.

I do not see how any industry can operate efficiently without production and efficiency reports.

Attitude of Employees

The employees should be made to feel that every thing they do is known to the management.

If a machine is stopped the management should know how long and what for, also what per cent. of the possible is being produced, not by groups but individually, such detail will expose numerous deficiencies, and the more one knows of the industry the more this will be appreciated.

If the help feel that the management is not interested in their work they too loose interest. It will also discourage co-operation and such a condition will prove expensive.

It is often said that finished costs are of no help to the selling department as the market sets the price, while this is true yet it should be known what products show the least profit and if the plant is operating as efficiently as possible.

Not until the industrial engineer has studied all branches of the industry can he hope to establish an effective cost system.

In conclusion I would say that if the cost accountant has the privilege of working in the factory, he would be wise to improve every opportunity to learn the business and he will be able to see things that others have missed and by experimenting with machinery endeavour to discover short cuts and new methods, that will convince the management of his importance to the industry. We are all pioneers in this branch of work, the task is difficult, yet it has its compensations in accomplishment.

PRIZES FOR 1931-32

$100 has been donated to the Society for prizes for Chapter reports in Cost and Management during the 1931-32 season. This will be distributed in a first prize of $50, a second prize of $30, and a third prize of $20, for the best reports of Chapter activities, prepared by the Chapter Secretary or other officer or member designated for that duty by the Chapter Directors, and published in Cost and Management.

Enrico Caruso said at a dinner of the Authors' League:

"Tenors are supposed to be conceited; authors also are supposed to be conceited; but the most conceited man alive is undoubtedly your bass.

"A bass told me one morning with a beatific smile about a dream he'd had the night before. He said he dreamed that he died and went to heaven, and, of course, they put him in the choir. There were millions on millions of tenors and baritones, sopranos and contraltos in the choir, but he was the only bass.

"He said they started on a great chorus, and it went splendidly. Then Gabriel, who was conducting, waved his baton towards the newcomer and whispered with a smile: 'Not quite so much bass, please.'"

COST LITERATURE

RECEIVED IN JUNE

COSTS as an Influencing Factor in Organization. C. W. Summers, F.C.W.A. Cost Accountant, June, 1931.

Installation of a Machine Hour Rate. Cost Accountant, June, 1931.

Manufacturing Processes in the Glass Industry. F. B. Towers. Cost Accountant, June, 1931.

Major Problem Created by the Machine Age. A. Andersen. National Association of Cost Accountants Bulletin, June 1, 1931.

Food Cost Accounting and Food Control. B. J. Von Schwarz, National Association of Cost Accountants Bulletin, June 1, 1931.

Fixed Charges in Hospital Accounting. C. R. Rorem. Journal of Accountancy, June, 1931.

Accounting for Community Musical Organizations. P. K. Webster. Journal of Accountancy, June, 1931.

Lost Motion in Industrial Selling. C. A. Fine. Society of Industrial Engineers Bulletin, May, 1931.

Human Element in Crises. M. A. Traylor. Society of Industrial Engineers Bulletin, May, 1931.

Let the Customer Plan Your Product. E. St. Elmo Lewis. Society of Industrial Engineers Bulletin, May, 1931.

Four-Plank Platform of Industrial Regularization. H. S. Person. Society of Industrial Engineers Bulletin, May, 1931.

How to Read a Balance Sheet. R. H. Cumming, C.A., F.S.A.A. Indian Accountant, May, 1931.

Cost Accountant and the Elimination of Waste. D. J. Hornberger. National Association of Cost Accountants Bulletin, June 15, 1931.

Overcoming Management Inertia. R. N. Wallis. National Association of Cost Accountants Bulletin, June 15, 1931.

Accounting With the Point System. R. W. Peden. National Association of Cost Accountants Bulletin, June 15, 1931.

Accounting for Fixed Assets. H. Knust, C.P.A. National Association of Cost Accountants Bulletin, May 15, 1931.

Holding Companies and Their Accounts. F. C. Marsh, A.C.A. Accountants' Journal, June, 1931.

Economics of Rationalization. F. H. Hill. Accountants' Journal, June, 1931.

Automobile Plant Depreciation and Replacement Problems. F. G. Woollard. Cost Accountant, May, 1931.

Some Observations on the Use of Costs in Works Administration. E. Graham. Cost Accountant, May, 1931.

COST LITERATURE

Service Costs. W. H. Davies, F.C.W.A. Cost Accountant, May, 1931.

Application of Cost Accountancy to Industry in 1931. I. J. Morris, F.C.W.A. Cost Accountant, May, 1931.

Cost Accountant of To-Morrow. R. Dunkerley, F.C.W.A. Cost Accountant, May, 1931.

Accounting for Sales on Instalment Basis—The Month's Proposition. American Accountant, June, 1931.

Shop Time Card Which Reduces Cost of Accounting. C. H. Broad. American Accountant, June, 1931.

Lithograph Plant Divided Into Production Centers for Accounting Purposes. H. J. Rieth. American Accountant, June, 1931.

NEW MEMBERS

The following are new members of the Society:

Montreal Chapter

Coleman, E. S., C.A., Beauharnois Light, Heat & Power Co., Montreal.
Dugal, B. A., Superintendent of Insurance, Quebec, Que.

CHAPTER NOTES

HAMILTON

Reported by R. Dawson, Secretary-Treasurer.

The Hamilton Chapter members are not allowing the grass to grow under their feet, for they have arranged an afternoon of golf at the Waterdown Golf Club, to be followed by a dinner at the Club House.

This is the first of a series of "get together" affairs planned by the "Ambitious City" Chapter, and it is hoped by this means to stimulate interest in the affairs of the Chapter during their fall and winter activities.

Quite a number of the members have already signified their intention of being present, and, with a contingent from the Toronto and Central Ontario Chapters expected, it promises to be a gala day. Numerous prizes for both high and low scores will be awarded, and those who attend are assured a good time.

THE TREND OF PRODUCTION COSTS

THE Dominion Bureau of Statistics index number of commodity prices, with 1926 as the base period, declined from 75.1 in March to 74.5 in April. The main groups compare as follows:

	Apr. 1930	Mar. 1931	Apr. 1931
Foods, beverages, and tobacco	99.4	76.2	75.9
Other consumers' goods	87.5	81.4	80.2
All consumers' goods	92.3	79.3	78.5
Producers' equipment	96.2	90.6	90.6
Building and construction materials	94.7	83.9	83.6
Manufacturers' materials	86.9	63.2	63.3
All producers' materials	88.3	66.9	67.0
All producers' goods	90.0	69.3	69.4
All commodities	91.2	75.1	74.5

The most important reductions in April were in the following: Rubber and its products, boots and shoes, live stock, milk and its products, fats, eggs, raw cotton, silk thread and yarn, wool blankets, brass, copper, lead, tin, zinc. The most important advances were in the following: Fresh domestic fruits, glass and its products.

The Dominion Bureau of Statistics index number of commodity prices, with 1926 as the base period, declined from 74.5 in April to 73.0 in May. The main groups compare as follows:

	May 1930	Apr. 1931	May 1931
Foods, beverages and tobacco	98.1	75.6	72.1
Other consumers' goods	86.7	80.1	79.7
All consumers' goods	91.3	78.3	76.7
Producers' equipment	91.5	90.6	90.1
Building and construction materials	92.9	83.6	83.4
Manufacturers' materials	85.2	63.3	62.4
All producers' materials	86.6	67.0	66.2
All producers' goods	87.1	69.4	68.6
All commodities	89.7	74.5	73.0

The most important reductions in May were in the following: Bakery products, animals and their products, milk, fats, eggs, raw cotton, raw silk, wool hosiery and knit goods, brass, copper, lead, tin ingots, petroleum products, plaster, asbestos, and industrial gases. The most important advances were in the following: Fruits, including fresh domestic and fresh foreign, and silk fabrics.

Mike was going to Dublin for the first time in his life and his friend Pat was giving him a few hints on what to do and where to go in the big city.

"What do I do when I go to the zoo?" asked Mike.

"You be careful about the zoo," advised Pat. "You'll see foine animals if you follow the words 'to the lions' or 'to the elephants,' but take no notice of the one 'to the exit,' for, begorrah, Mike, it's a fraud, and it's outside I found myself when I went to look at it."